



Armed Forces College of Medicine AFCM

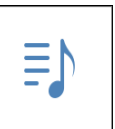




Histological Structure of Salivary glands

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Prof. of Histology & Cell Biology





By the end of this lecture the student will be able to:

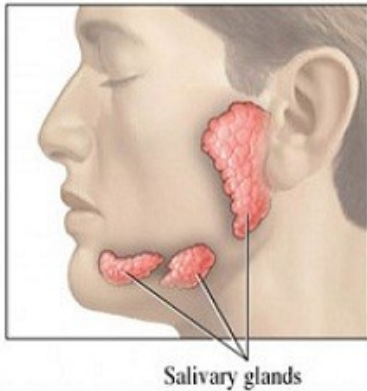
1. Classify different types of salivary glands.
2. Describe the structure of the major salivary glands: Stroma and Parenchyma.
3. Correlate between structure and function of the major salivary glands.
4. Compare between the structure of different types of salivary glands.



Key points of the lecture

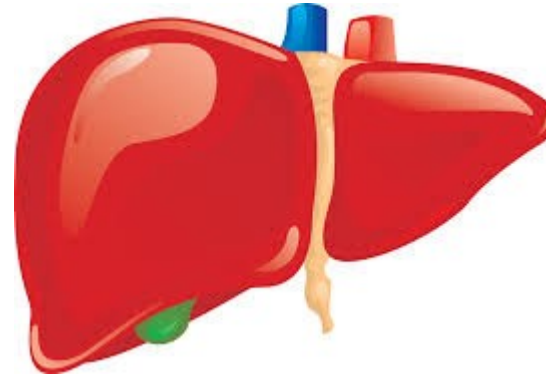
- Types of salivary glands
- Types and histological structure of acini
- Types and histological structure of ducts
- Histological structure of the major salivary glands

Gut- associated glands



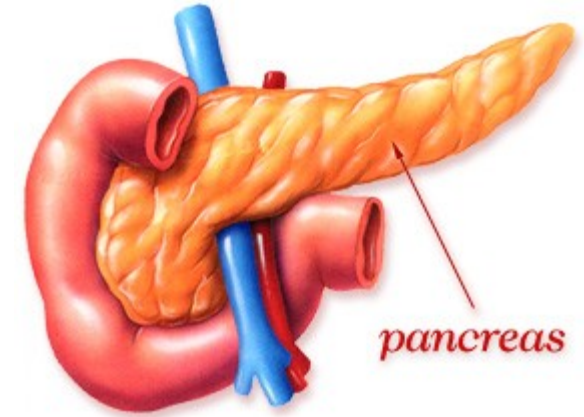
Salivary glands

<https://mgmtrialservices.medicalillustration.com/generateexhibit.php?ID=4626&ExhibitKeywordsRaw=&TL=&A=100264>



Liver

https://cdn.clipart.email/751f2fdb829d4323f4bff877af4a958f_liver-clipart-4-clipart-station_612-417.jpeg



Pancreas

https://66.media.tumblr.com/5e5e00b95e64ad03af663528d41b8709/tumblr_inline_p7fy7yQ4y21swujqt_540.jpg



Salivary glands



Main (major)
(3 paired glands)
Compound tubulo-



<http://edelweisspublications.com/keywords/30/1134/Salivary-Gland-Disorders>

Accessory (minor)
(Multiple & small)

They are groups of salivary glands having no capsules present in the lamina propria of the mucous membrane of the oral cavity.



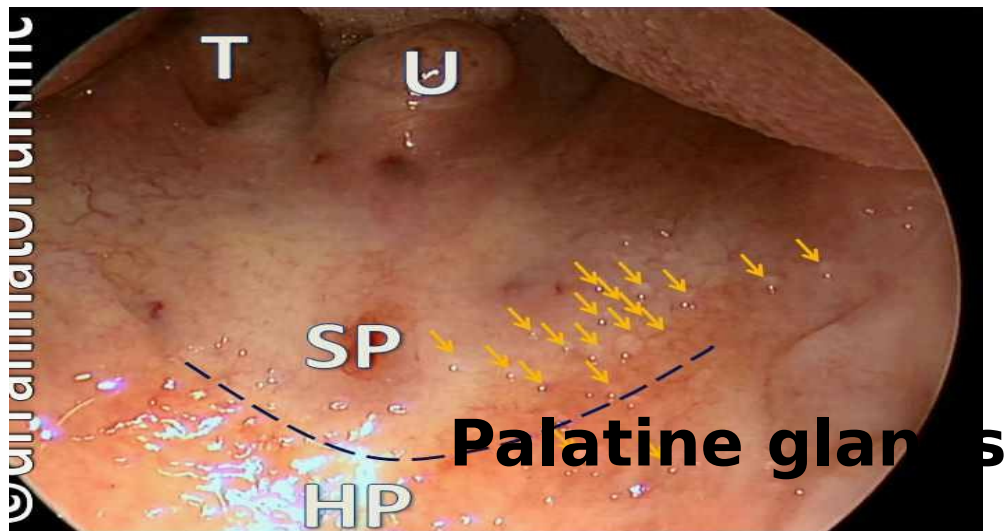
A- Minor (accessory) salivary glands



<http://www.myhealth.gov.my/wp-content/uploads/median-rhomboid-glossitis.jpg>



https://tajpharma.com/Diseases_B/Cysticercosis.jpg

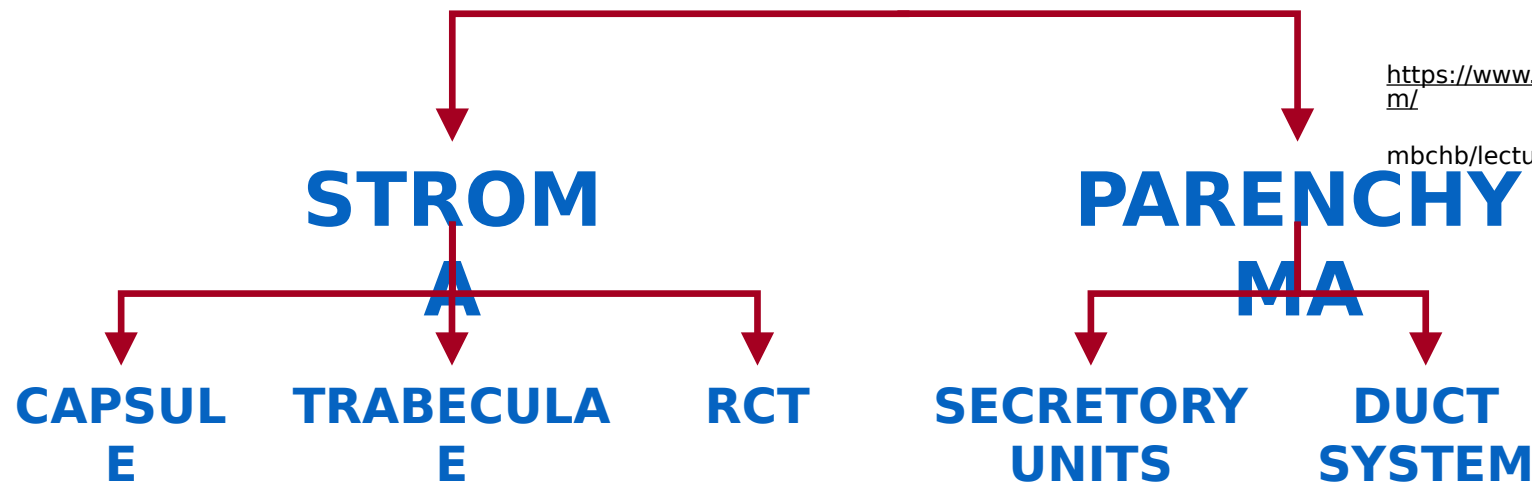
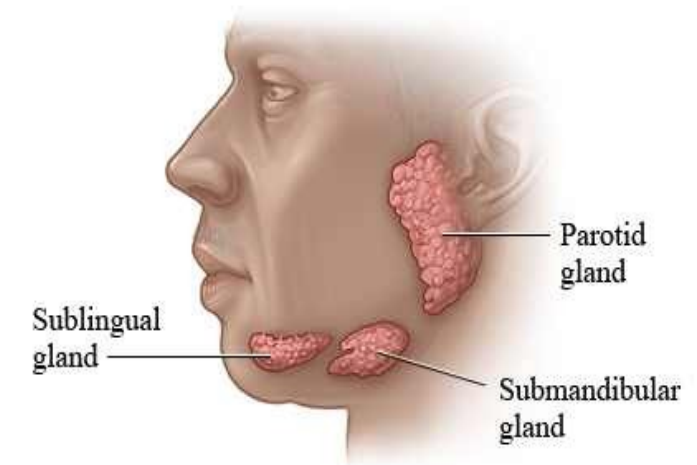


B- Major (main) salivary glands



Three pairs of salivary glands:

- The parotid glands.
- The submandibular glands.
- The sublingual glands.



<https://www.studocu.com/en/document/university-of-birmingham/>

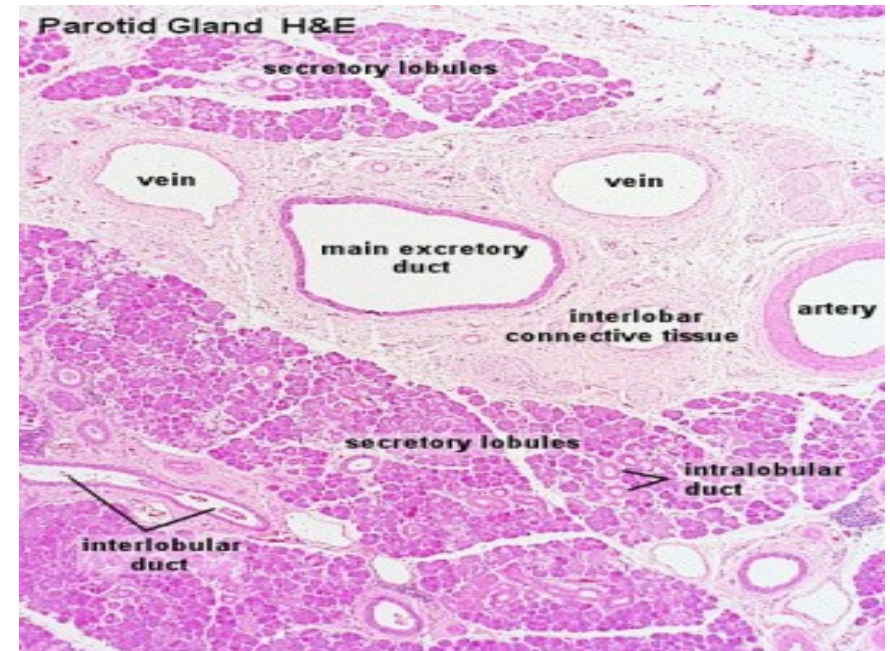
[mbchb/lecture-notes/di-g-revision-lecture-notes-all/668231/view](https://www.studocu.com/en/document/university-of-birmingham/mbchb/lecture-notes/di-g-revision-lecture-notes-all/668231/view)



Stroma of main salivary glands



1. **A capsule:** of a **dense C.T.** containing (BVs, lymphatics and nerves).
2. **C.T. septa (interlobular septa):** divide the gland into $\square$ lobules.
3. **Reticular C.T.:** supports parenchyma.



https://embryology.med.unsw.edu.au/embryology/index.php/Salivary_Gland_Development

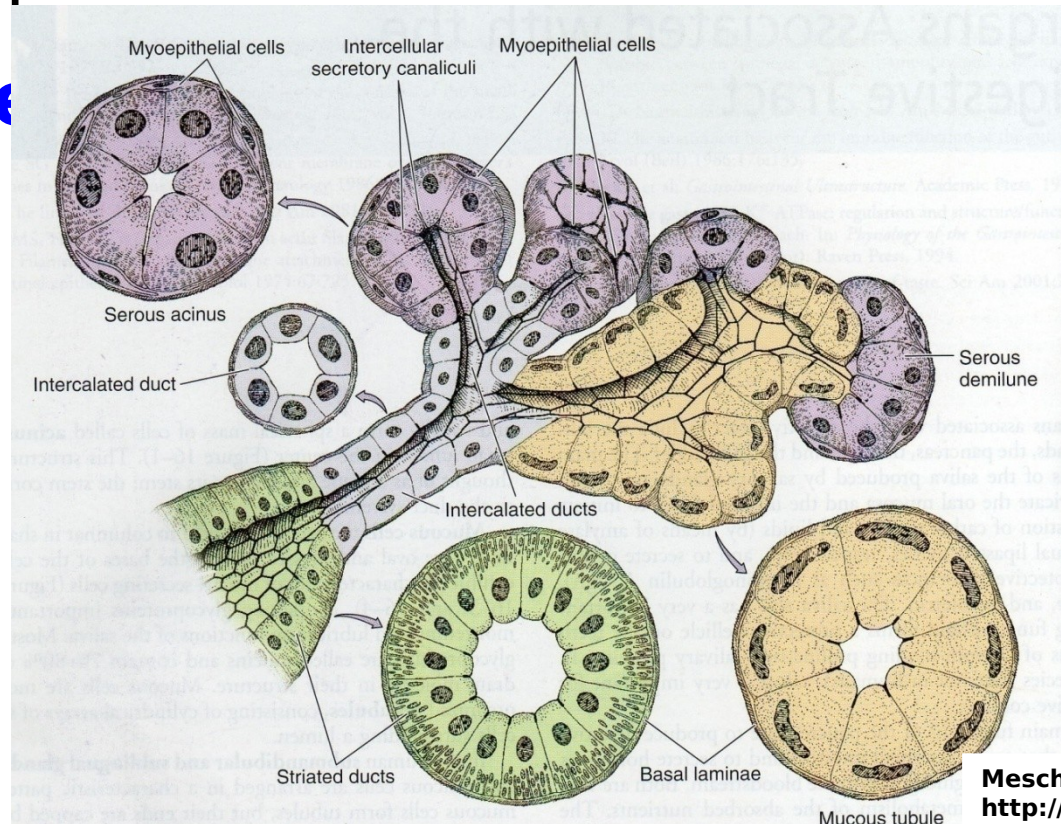


Parenchyma of main salivary glands



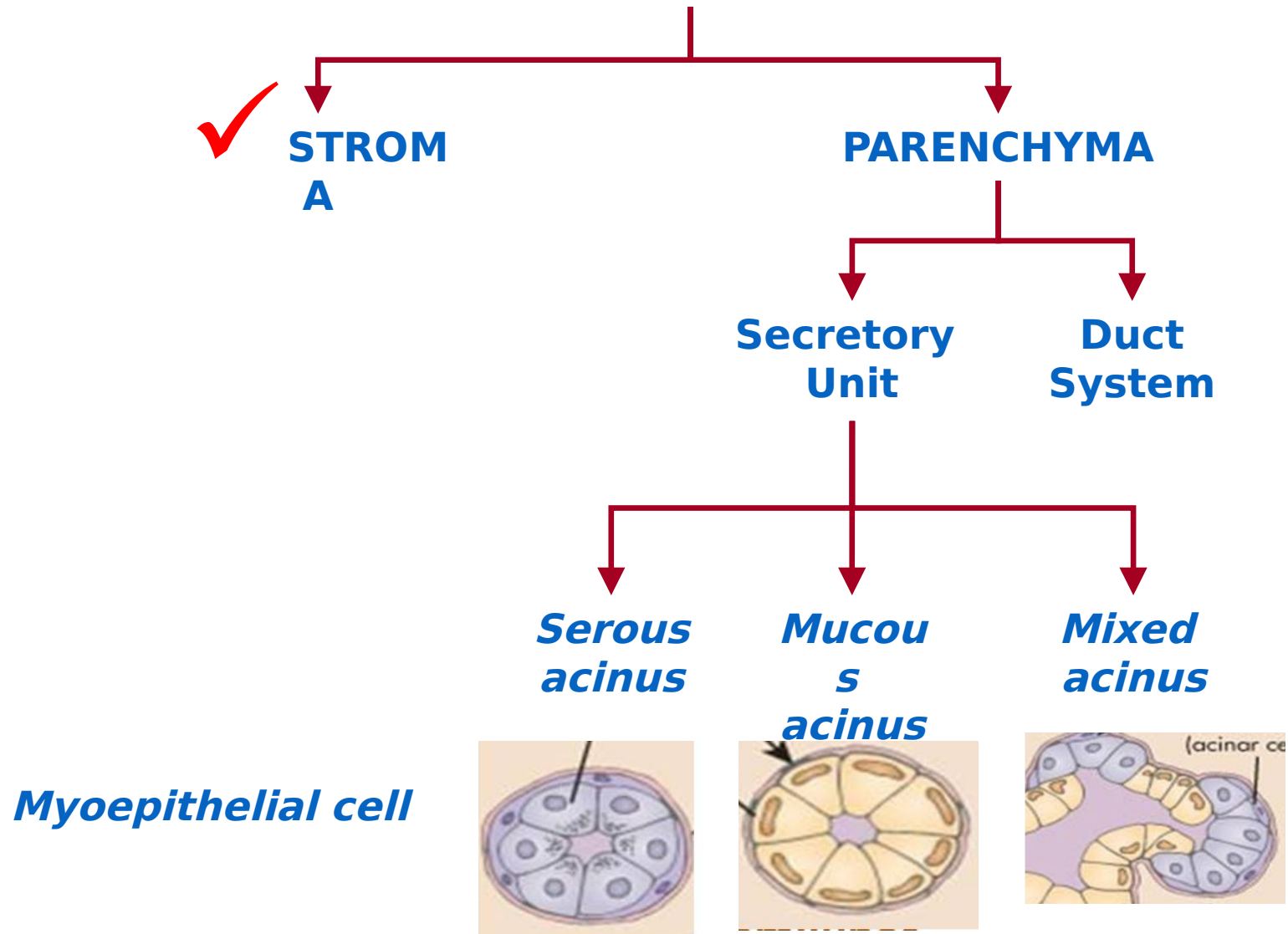
B- The parenchyma: is formed of:

- 1. Secretory portion:** serous, mucous and mixed acini
- 2. Duct system**



Mescher AL: Junqueira's Basic Histology: Text and Atlas, 14th
<http://www.accessmedicine.com>

Structure of main salivary glands

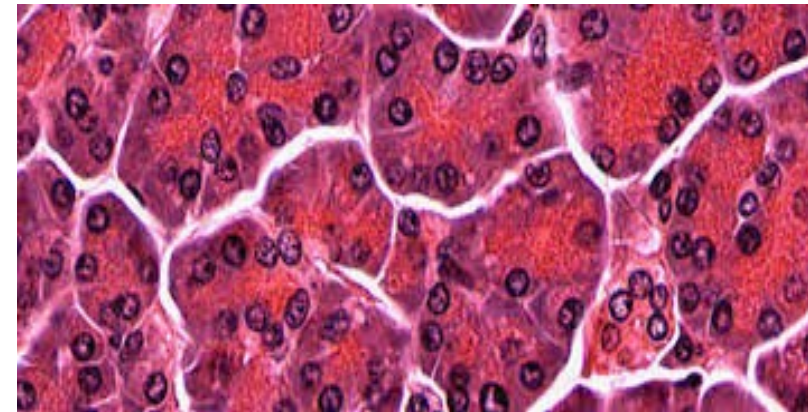


Serous acinus



LM

- Small in diameter & narrow lumen.
- Cells:
 - Vesicular, rounded basal nuclei.
 - Basal basophilic cytoplasm.
 - Apical acidophilic zymogen granules.



<http://www.siumed.edu/~dking2/erg/images/GI119b.jpg>

- Surrounded by a **few** myoepithelial cells



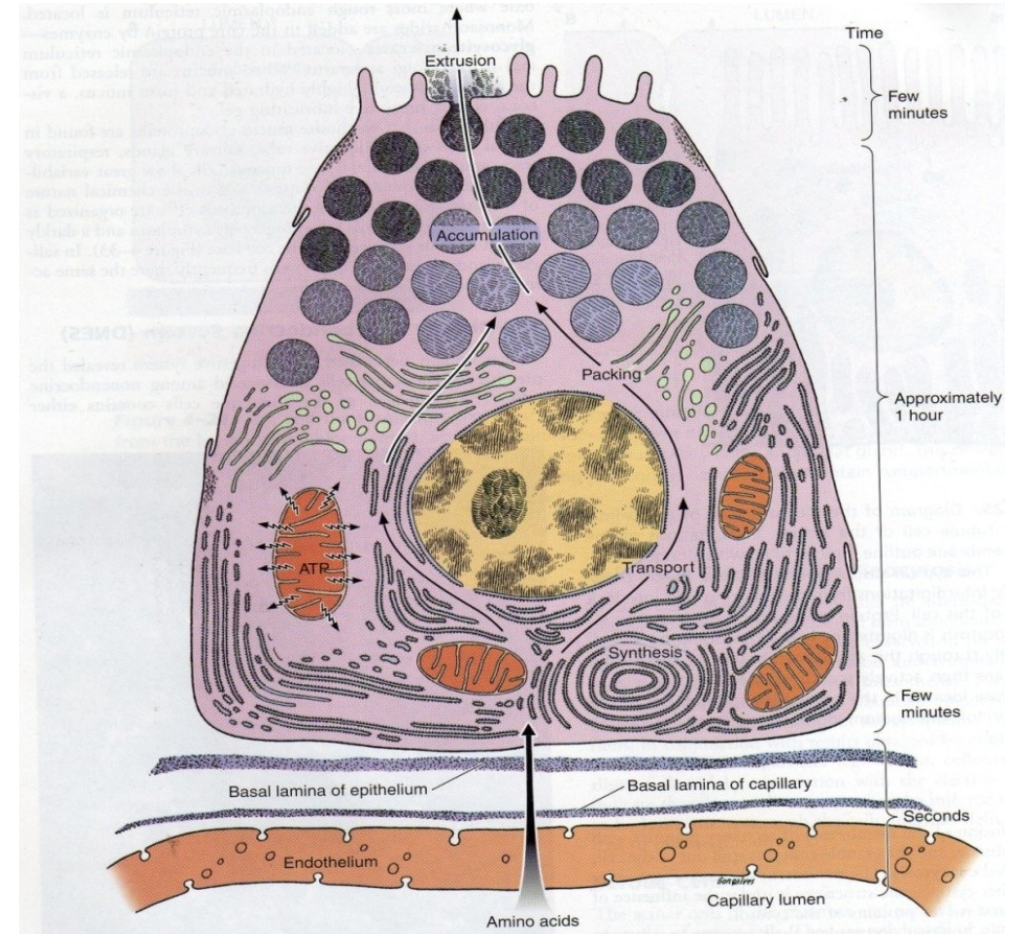
Serous acini



EM

Protein secreting cell

- abundant basal **RER**,
- prominent supranuclear **Golgi** complex
- numerous membrane bound spherical secretory **granules**. (rich in amylase).
- **Mitochondria**



https://www.google.com.eg/imgres?imgurl=http://intranet.tdmu.edu.ua/data/kafedra/internal/histolog/classes_stud/en.../stomat/ptrn/1/05%2520Epithelial%2520tissues.%2520Glandular%2520epithelium.%2520Glands..files/image074.jpg

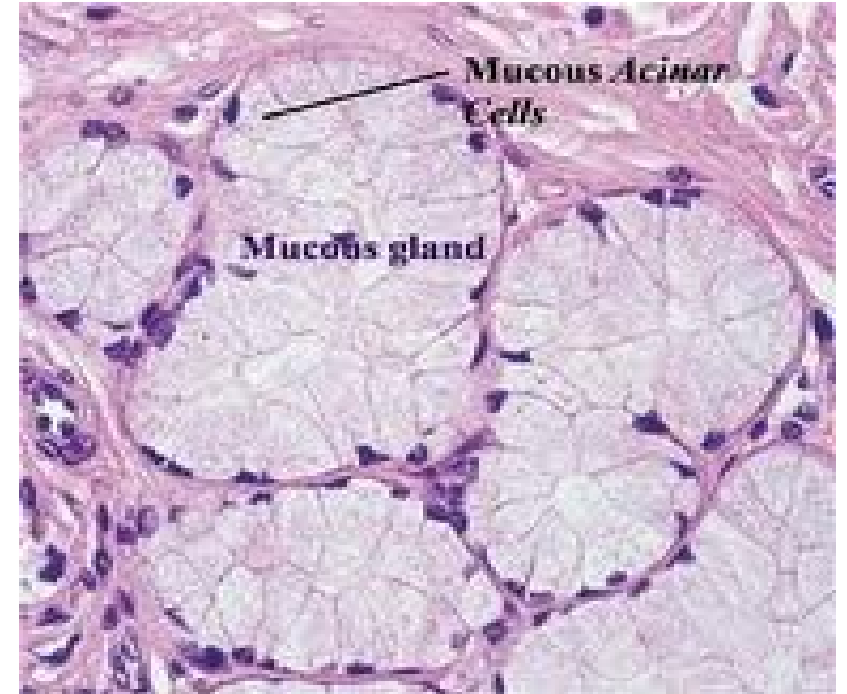


Mucous acini



(LM)

- Large diameter and wide lumen.
- Cells
 - Flattened basal nuclei.
 - Pale basophilic, foamy cytoplasm (due to dissolved mucin granules).
- Surrounded by **numerous** myoepithelial cells .



<https://www.google.com.eg/imgres?imgurl=https://s3.amazonaws.com/classconnection/63/flashcards/11241063/jpeg/>

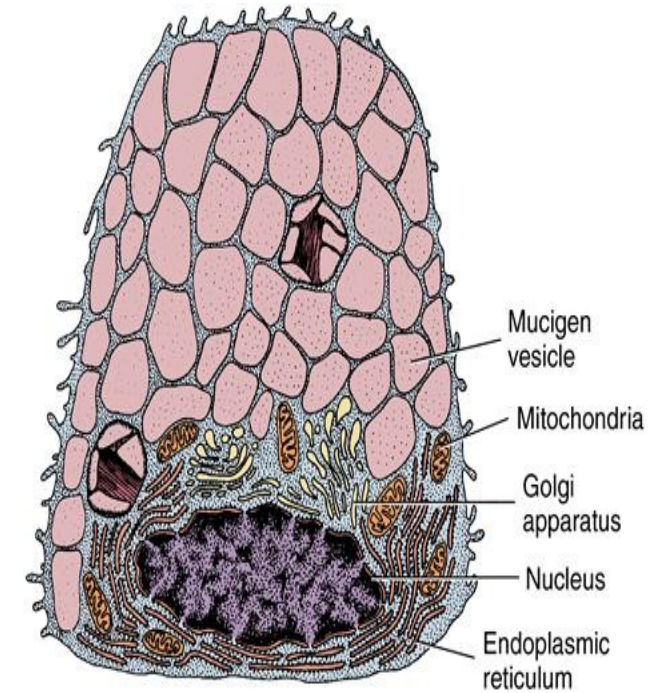
Mucous acini



EM

Glycoprotein secreting cell

- basal **RER**
- supra nuclear **Golgi** (greater carbohydrate component)
- numerous membrane bound mucin **granules**.
- **mitochondria**



<https://pocketdentistry.com/wp-content/uploads/285/F00024Xf15-06-9780323082563.jpg>

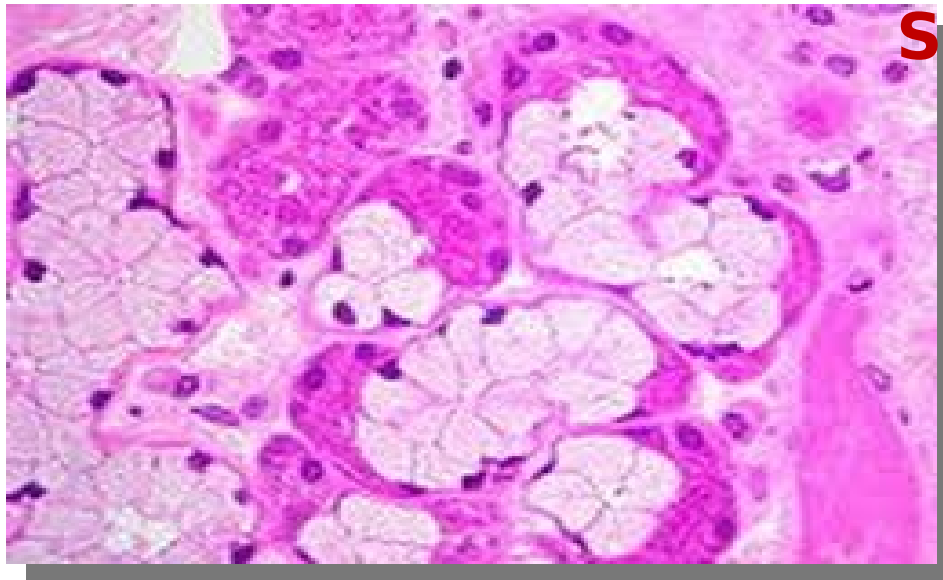
Function: secrete mucus (containing glyco-proteins) important for moistening and lubricating function

Mixed acinus



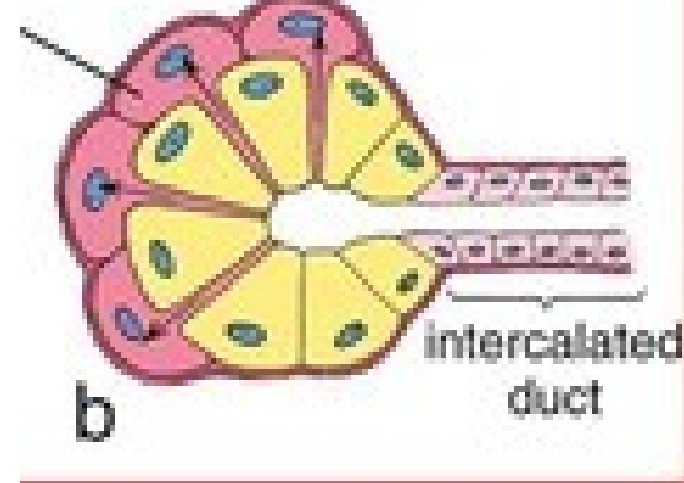
LM:

- Formed of a mucous acinus which is capped by aggregation of serous cells



https://cdn.goconqr.com/uploads/media/image/19288619/desktop_ef9c0879-f3b7-47bf-9365-a5af47e5123b.jpg&imgrefurl=https

Serous demilune



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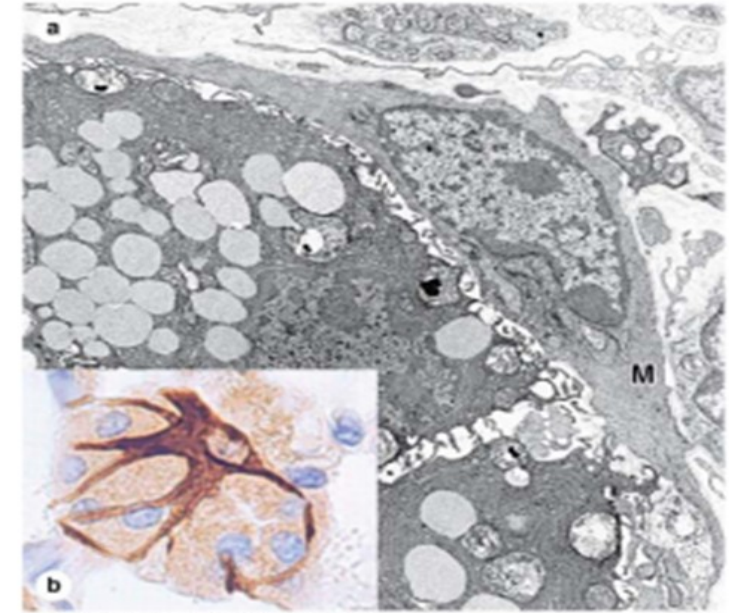
Myoepithelial (basket) cells



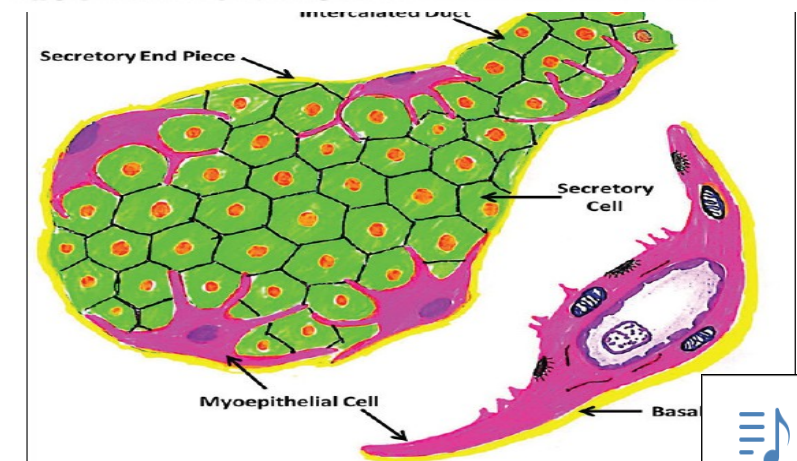
- Contractile cells having **actin** and **myosin**
- Numerous processes.
- Present between plasma membrane of secretory cells and basal lamina & form **hemi-desmosomes** with it.
- Also around cells of proximal part of duct system.

Function:

- movement of secretion toward ducts



Source: Mescher AL: Junqueira's Basic Histology: Text and Atlas, 12th Edition. <http://www.accessmedicine.com>. Copyright © The McGraw-Hill Companies, Inc. All rights reserved.



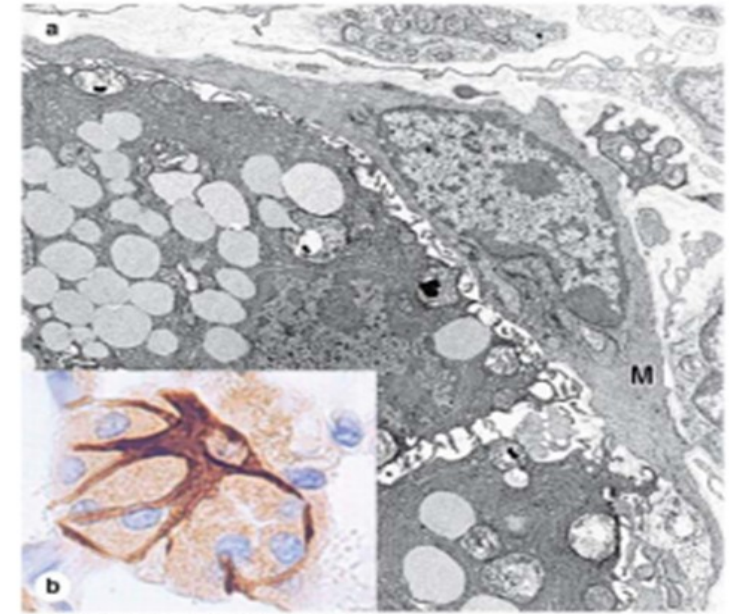
Myoepithelial (basket) cells



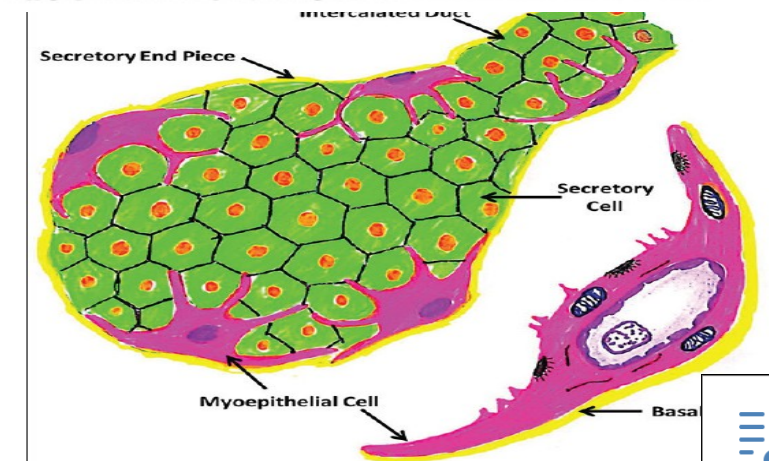
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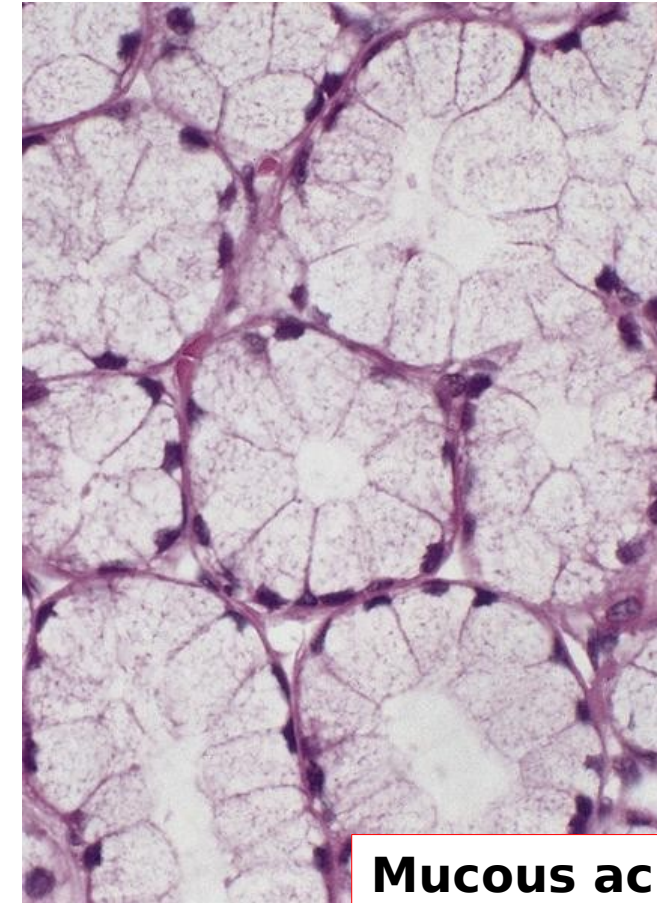
- What are the types of acini?



Serous acini



Mixed acini



Mucous acini

Mescher AL: Junqueira's Basic Histology: Text and Atlas, 14th Edition
<http://www.accessmedicine.com>



Duct system

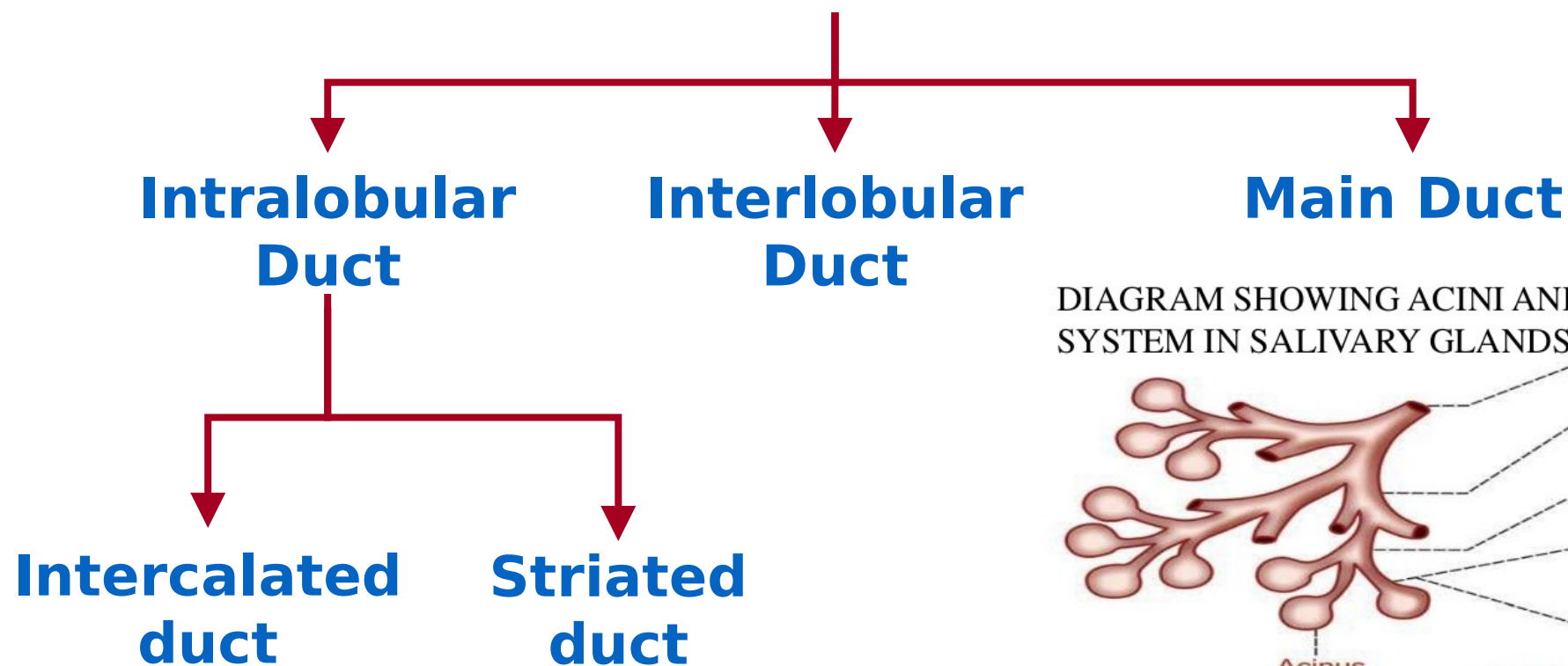
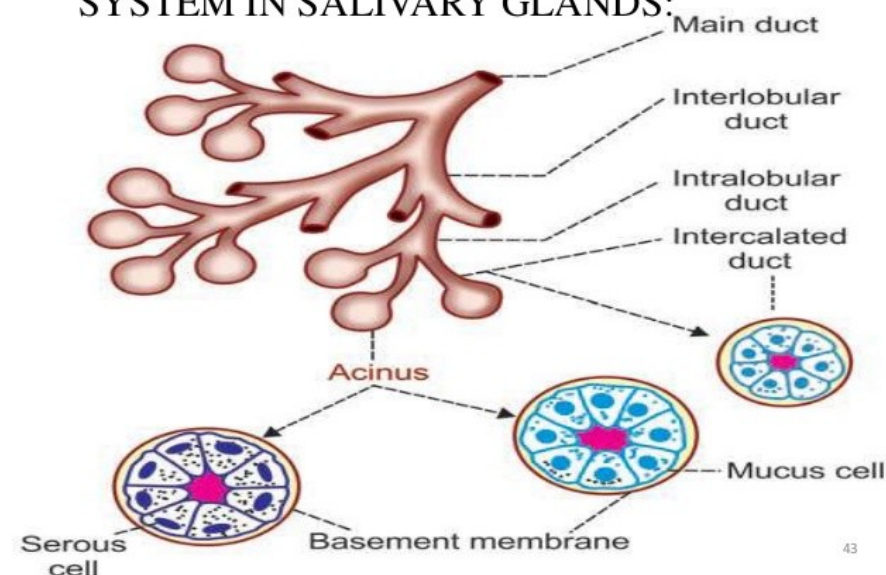
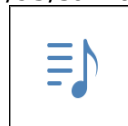


DIAGRAM SHOWING ACINI AND DUCT SYSTEM IN SALIVARY GLANDS:



<https://image.slidesharecdn.com/uppusalivaryg-150804093144-lva1-app6891/95/salivary-glands-43-638.jpg?cb=1496819611>

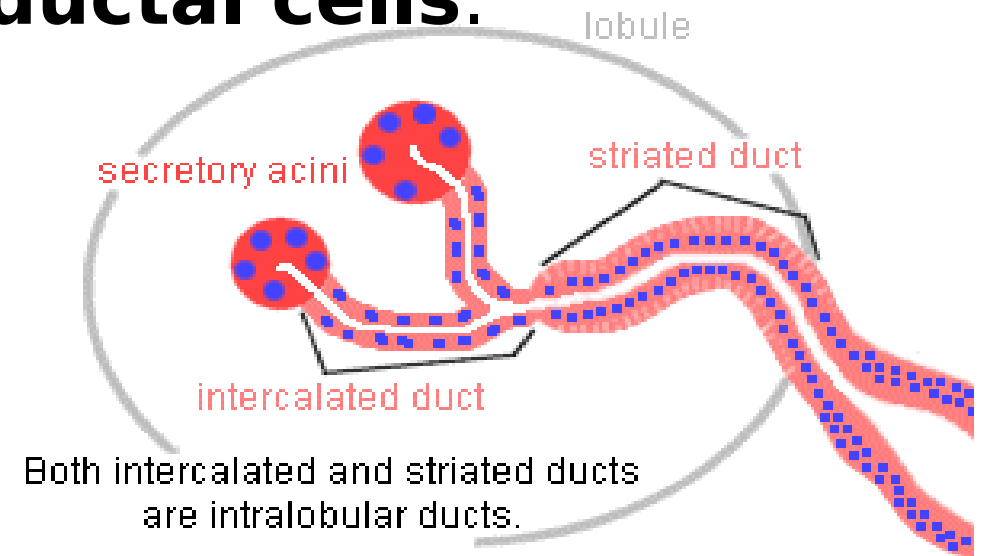


Duct system - Intralobular



1- The intercalated ducts:

- Are lined by **cuboidal cells**.
- **Function: cells** have the ability to divide and differentiate (**stem cells**) into **secretory** or **ductal cells**.



https://embryology.med.unsw.edu.au/embryology/images/d/d2/Gland_duct_histology_cartoon.jpg



Duct system (cont.)

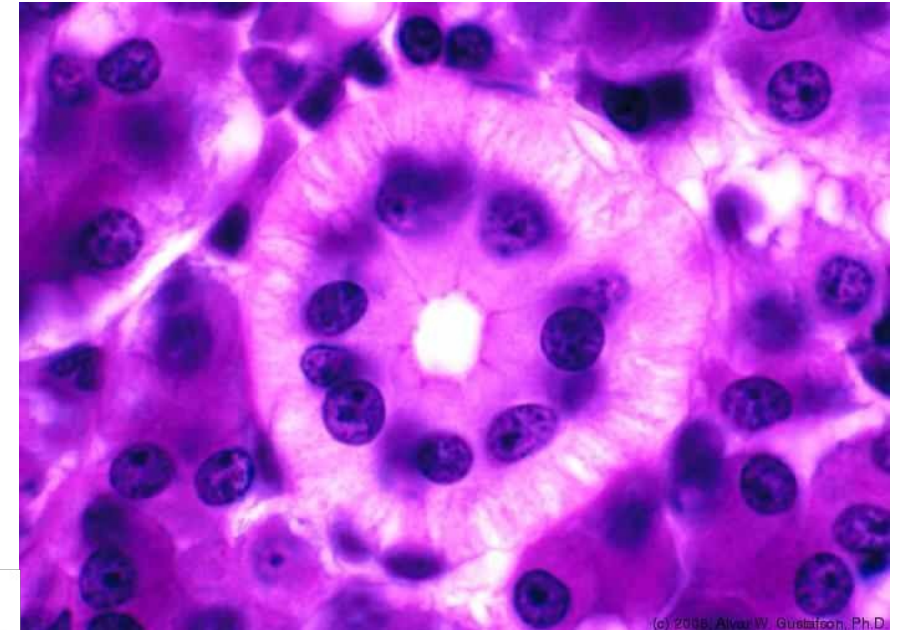
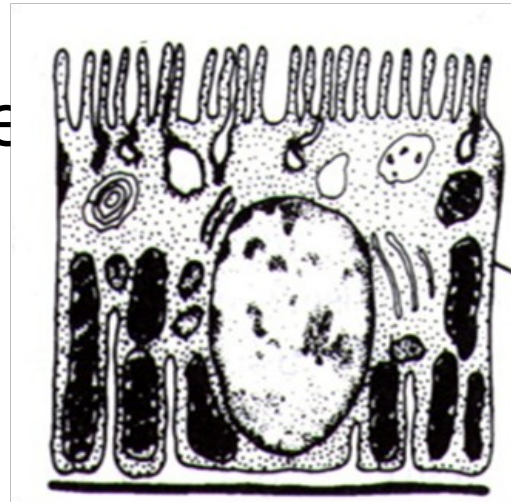


2-Striated (Secretory) ducts:

- Lined by cubical or low columnar cells
- acidophilic granular cytoplasm, basal striation

EM:

- Basal infolding of cell membrane (contains Na-K ATPase)
- Basal mitochondria



https://lh3.googleusercontent.com/68losJLFr2uslqbc_pbHtQJdLt1jgkkg4Uq_udImgEScMArEm_SustveBtjKArgbNhp_bMM=s118

Duct system (cont.)



Functions of the striated ducts:

- 1. Modify the electrolytes** of the secretion of the acini (forming secondary saliva).
2. Secretion of **lysozymes** which attack bacteria.
- 3. Transport of IgA** secreted by the plasma cells present in the surrounding C.T. into its lumen.



The excretory ducts

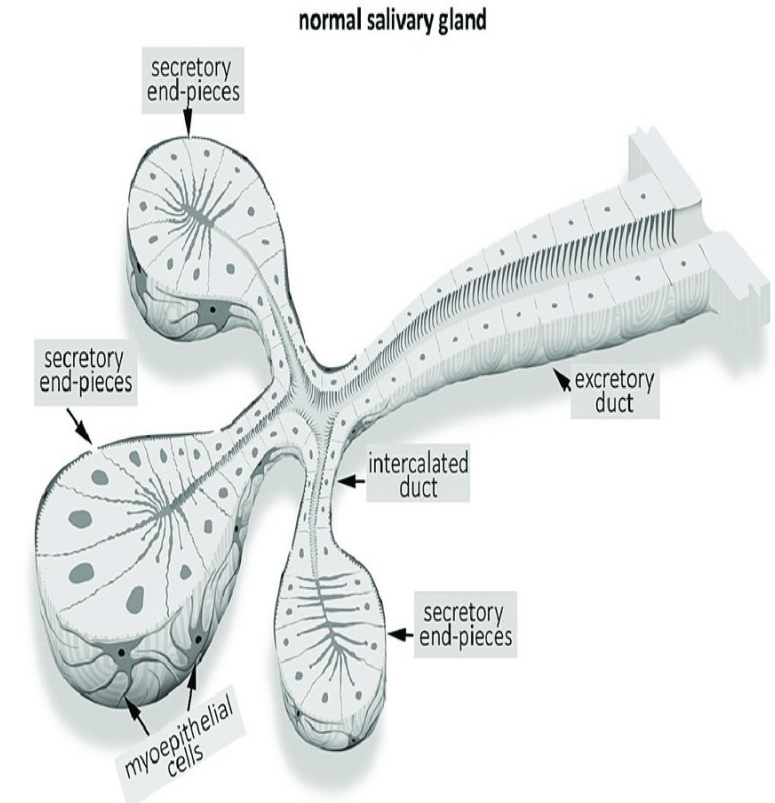


1- The inter lobular ducts:

- Small ducts □ columnar
- larger ducts □ pseudostratified columnar
- distal parts □ stratified columnar epithelium.

2- The main duct of each major salivary gland:

- The proximal part is lined with □ stratified columnar epithelium.
- The distal end is lined with □ non-keratinized stratified squamous epithelium which ultimately open □ into the mouth cavity.



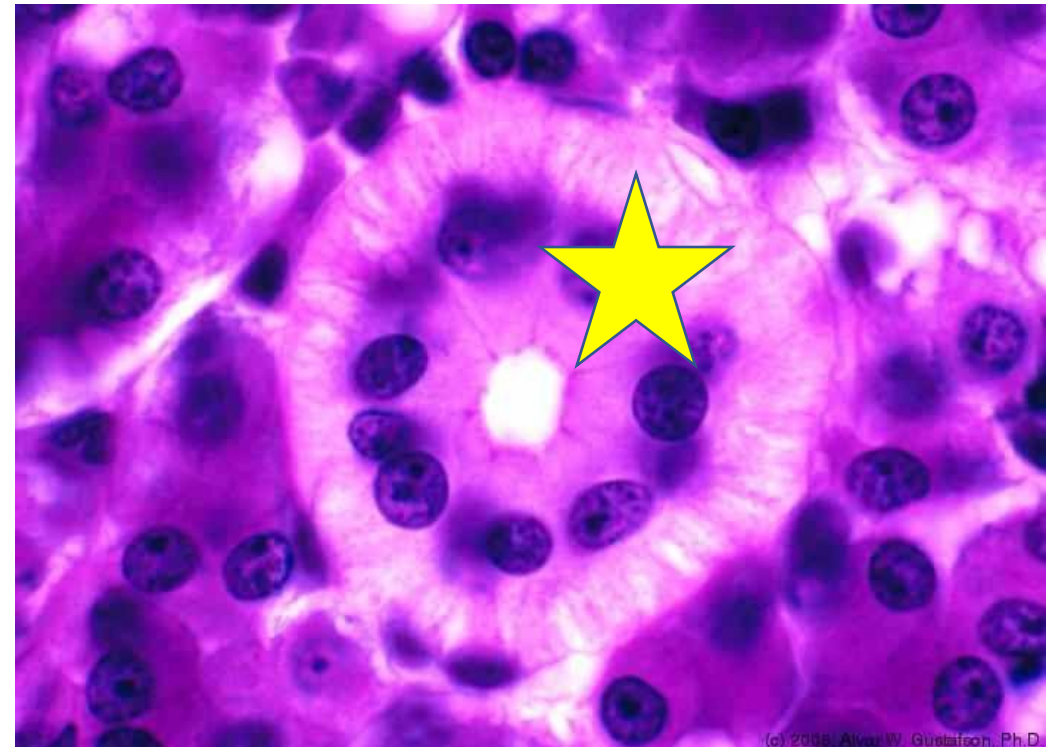
https://www.researchgate.net/profile/Fernando_Soares3/publication/313837825/figure/fig11/AS:667035931533313@1536045167119/Schematic-view-of-the-normal-salivary-gland-structure-showing-the-secretory-end-pieces.png

Lecture Quiz

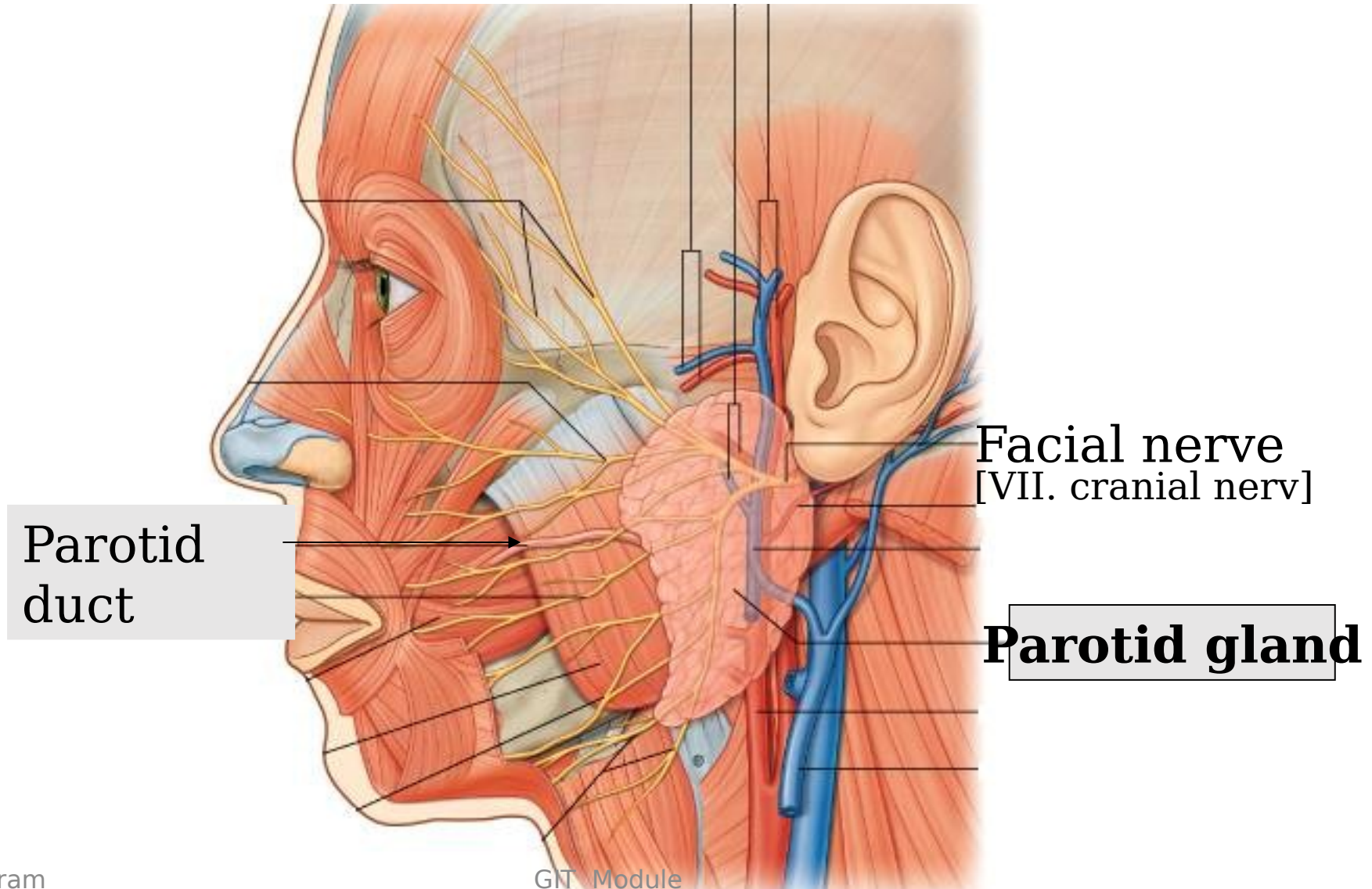


Which of the following best describes the cells in this structure?

- a) Are squamous cells
- b) The cytoplasm is basophilic granular with basal striation
- c) Have basal infolding of cell membrane (contains Na-K ATPase)
- d) Apical mitochondria
- e) Cells act as stem cells



The Parotid glands

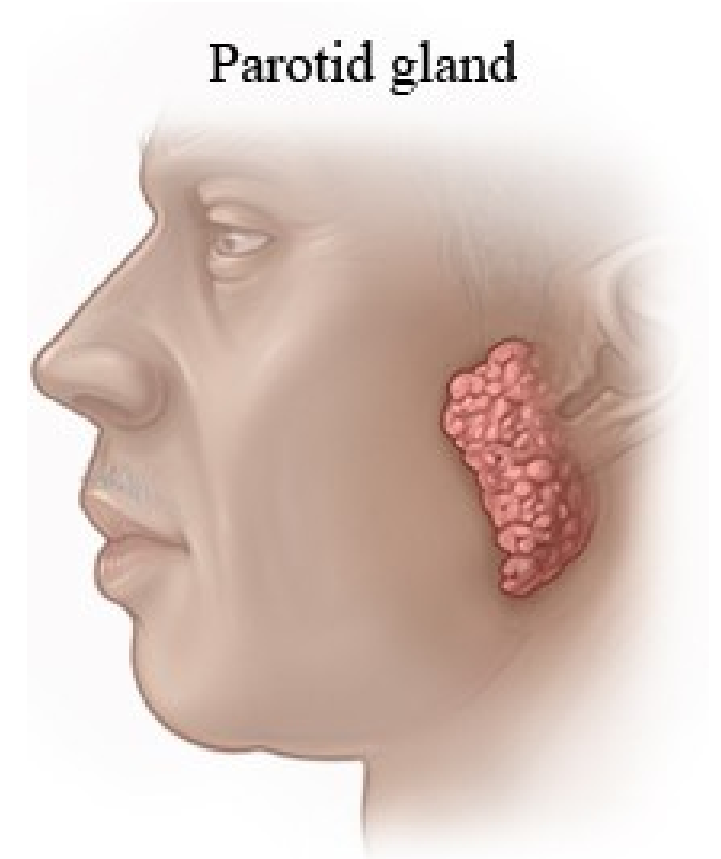


The Parotid glands



Pure serous glands:

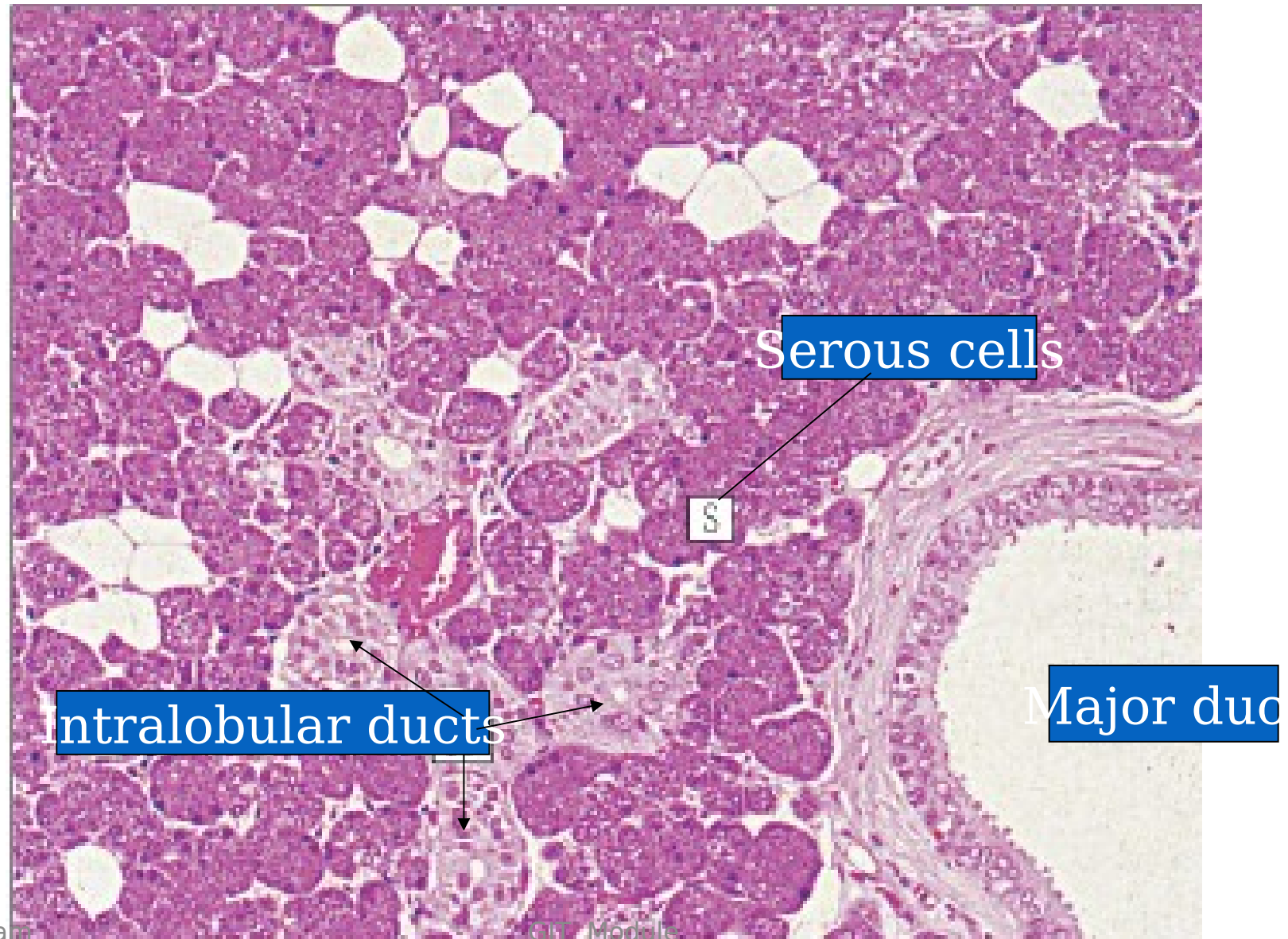
- Have a thick well-developed capsule and interlobular septa.
- The septa contains fat, lymphocytes and plasma cells .
- Have pure serous acini and prominent striated secretory ducts.



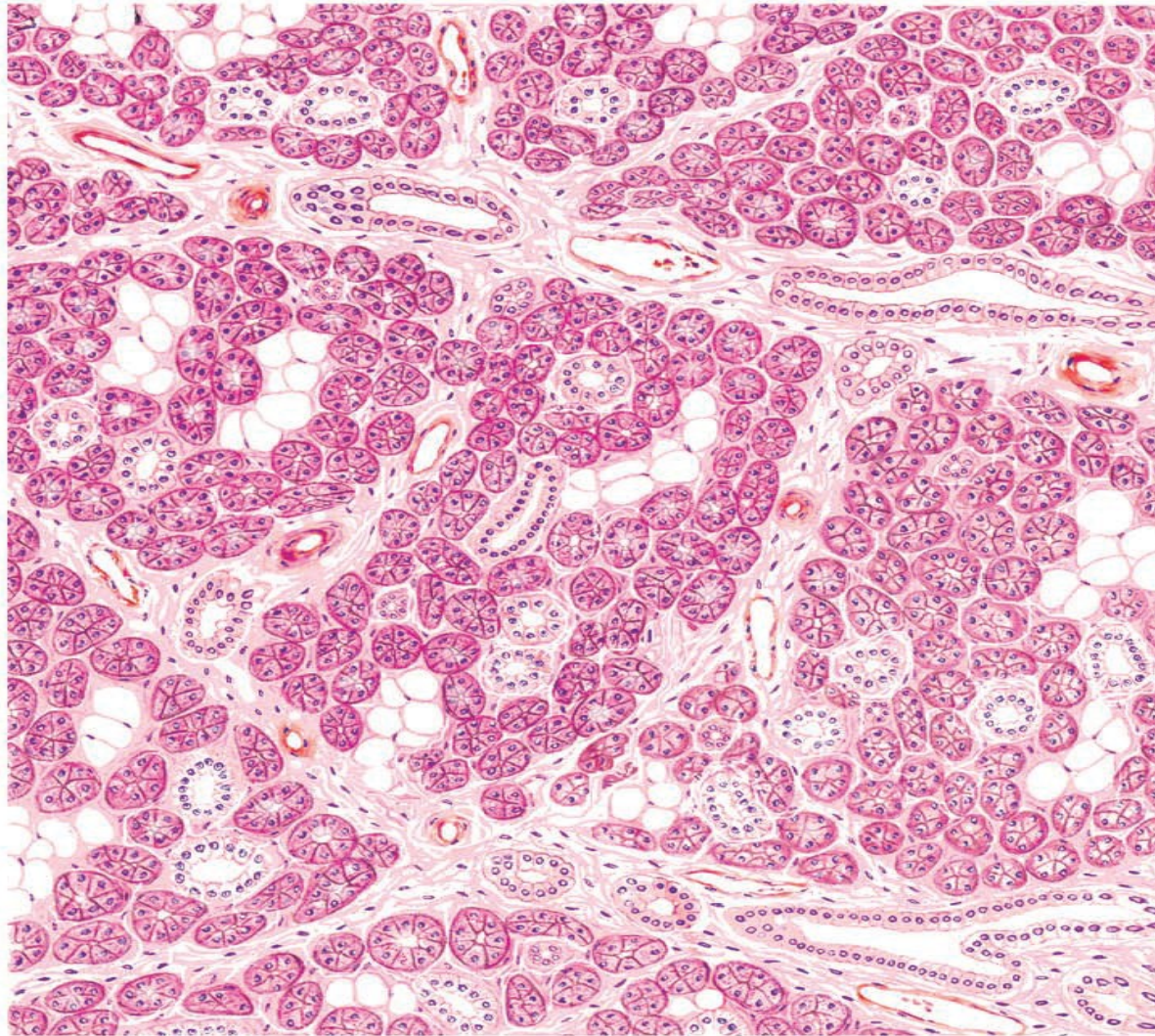
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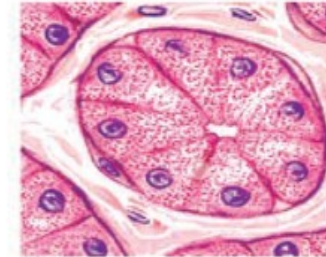
The Parotid glands



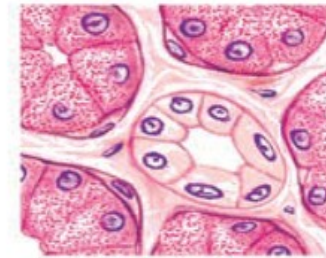
The Parotid glands



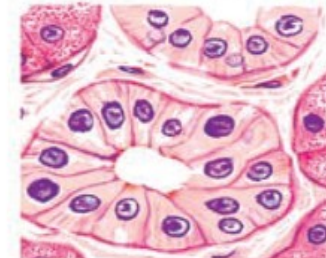
Serous acinus



Intercalated duct



Striated duct



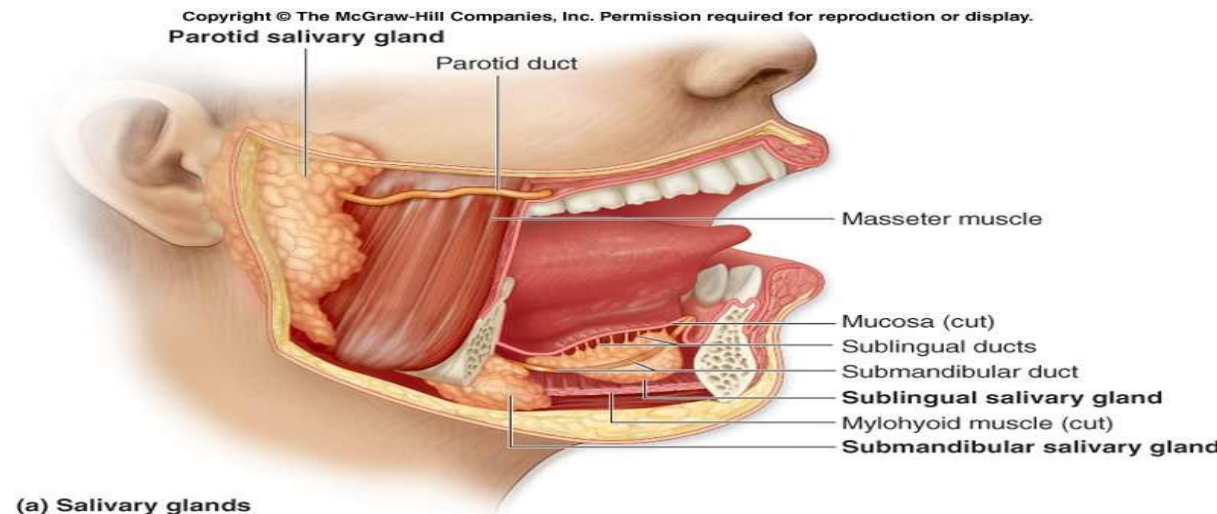
Interlobular duct



The submandibular glands



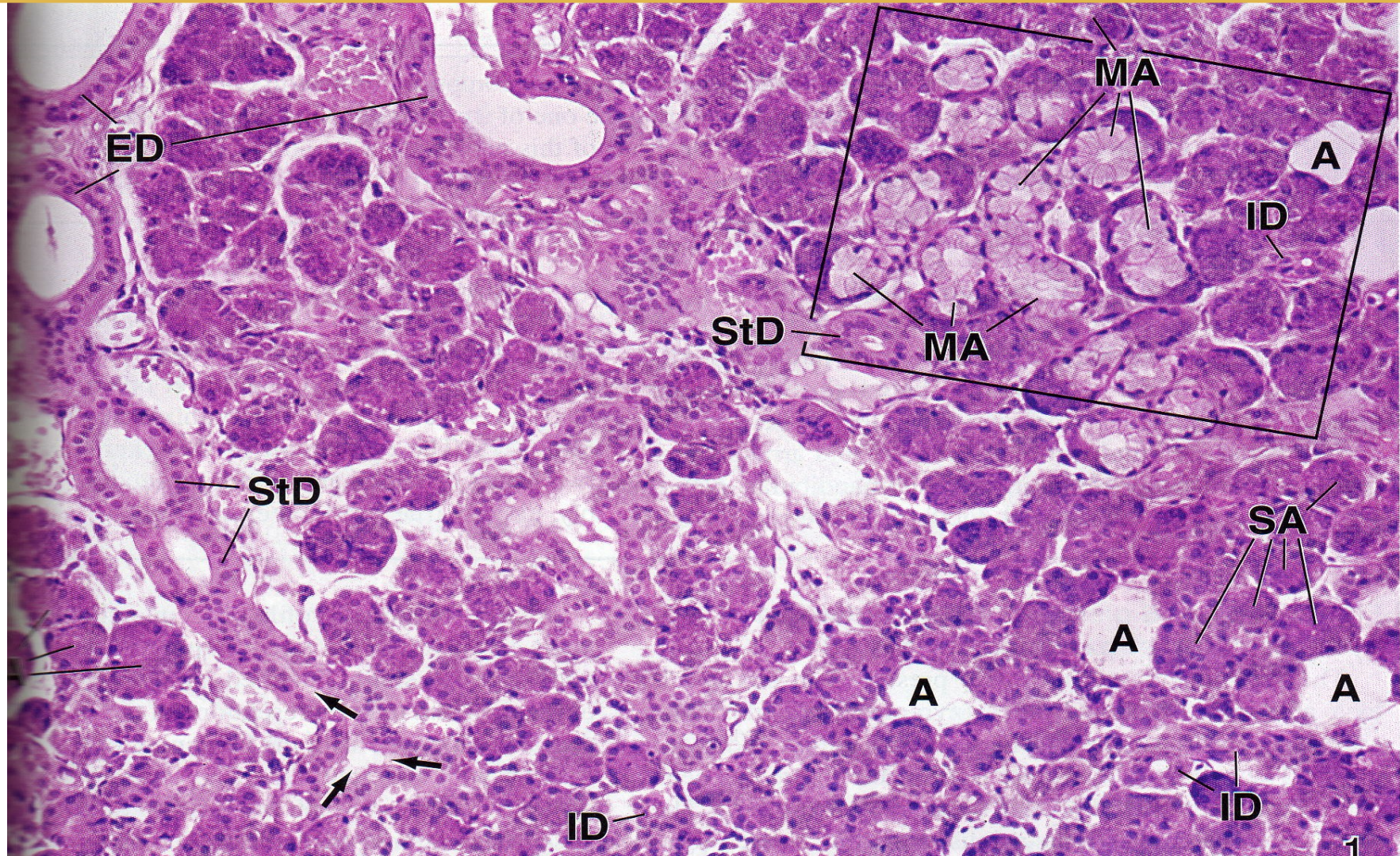
- Have a **thick C.T. capsule** and **thin C.T. septa**, containing **less fat cells**.
- The acini are **predominantly serous** with **few mucous and mixed acini**.



<https://i.pinimg.com/originals/f2/a4/5f/f2a45f807e7ea46c65339c20c04157e5.jpg>



The submandibular glands



<https://classconnection.s3.amazonaws.com/20/flashcards/1746020/png/>

[how_do_you_identify_sd_vs_interlobular_1348335793157-thumb400.png](#)

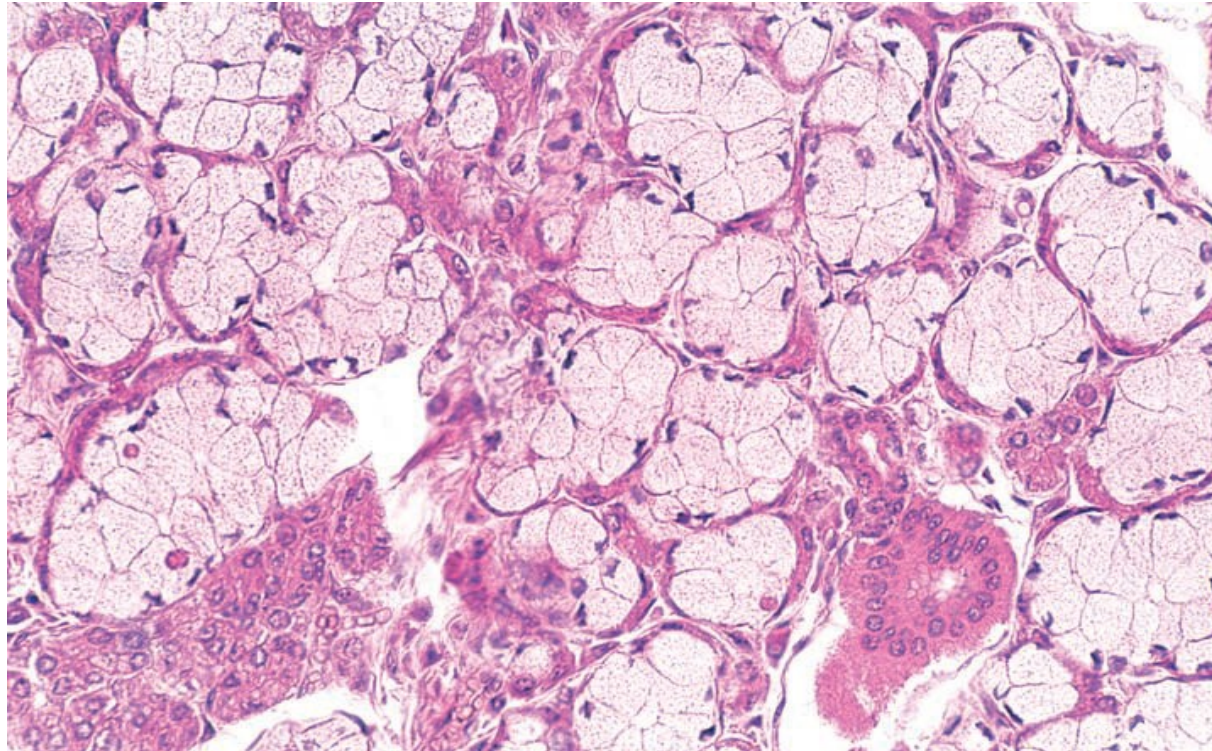


The sublingual glands

(mixed glands)

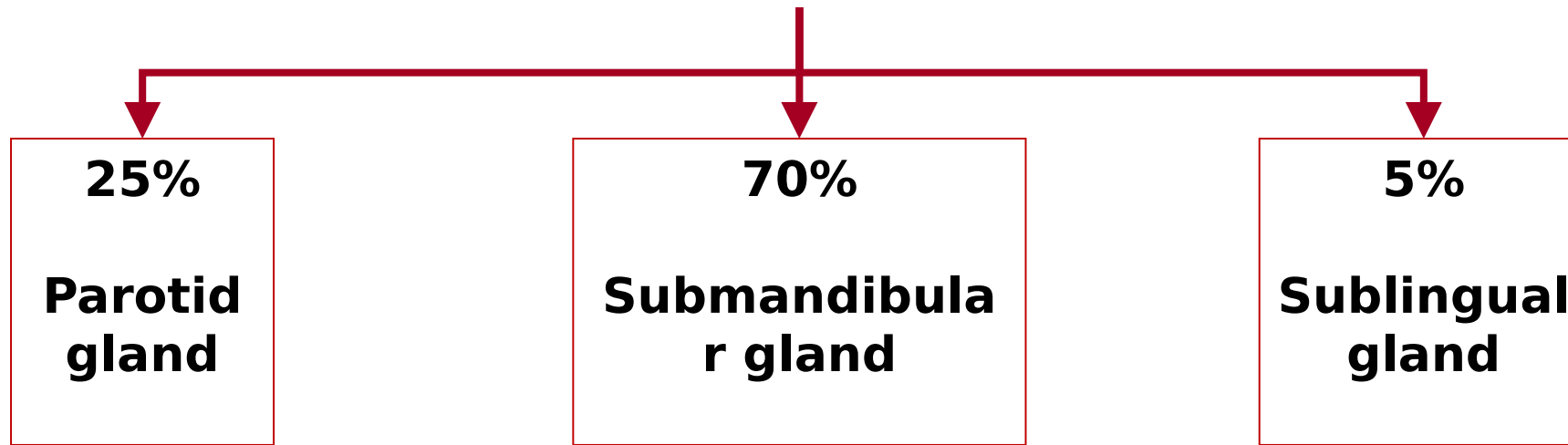


- Have **predominantly mucous acini** with **some mixed acini**.



http://3.bp.blogspot.com/-ozDgB5R9jlc/T0lYyW7DcSI/AAAAAAAAAhM/S2x_Eev0GmE/s1600/Corel055.jpg

Saliva



Functions:

- Lubrication
- Taste sensation.
- Protective coat on teeth (proline rich prt).
- Initial digestion (amylase)
- Antibacterial (Ig A & lysozyme)
- Wound healing (EGF & clotting F.)



Lecture quiz



B	A
Contain actin and myosin	Serous cells
Have basal infoldings	Intercalated duct
Secrete glycoprotein	Myoepithelial cells
Have acidophilic secretory granules	Mucous cells
Cuboidal cells	Striated duct





Parotid glands:

- a. Are purely mucous.
- ☒ b. Show prominent striated ducts.
- c. Have thin capsules.
- d. Secrete 75% of saliva





Submandibular glands

- a. Are purely serous.
- b. Are purely mucous
- c. Are mostly serous
- d. Are mostly mucous

Lecture quiz



Match

B	A
Submandibular gland	Purely serous
Sublingual gland	Mostly serous
Parotid gland	Mostly mucous



Summary



Salivary glands are classified into major (parotid, submandibular, sublingual) and minor. They are formed of stroma and parenchyma (acini and ducts). Types of acini are serous, mucous and mixed.

Ducts are intralobular (intercalated, striated), interlobular and main. The parotid gland is purely serous. The submandibular is predominantly serous. The sublingual is predominantly mucous.

Suggested textbooks



1- Junqueira`s Basic Histology; Text and Atlas. 14th edition 2016, pp: 329-332.

2- Histology atlas and test: Michael H. Ross and Wojciech Pawlina, 7th edition, 2015, pp: 545-553





**Thank
You** *Mahalo*
Tack **Kiitos**
Grazie **Thanks**
Obbrigado **Toda**
Gracias **Merci**

